



From Above *the* Fray

by *Carson Mark*

Many people thought of Stan as lazy. In one way of speaking they were right: he never was observed cutting the lawn or washing dishes, and he engaged only extremely rarely in the tedious, straightforward—albeit demanding—business of actually carrying through long and complicated and step-wise dependent numerical calculations.

But in a more important way of speaking they were wrong. He was never asleep. He was constantly alert to the strange ways in which people applied and immersed themselves in immediate and detailed problems. He did not consider such efforts to be undeserving of credit—indeed he recognized them as essential to any practical outcome—but for the most part they were outside the range of his direct interest and personal style. He thought, and thought constantly, in a qualitative and unconstrained way. In this fashion he made a number of exceedingly

important observations bearing on the weapons program.

He was among the first to realize how valuable the Monte Carlo method would be when electronic computers should make extensive applications of the method feasible. Even before that time, in connection with a particular aspect of the Super Program that was essentially impregnable against analytic efforts, he and C. J. Everett applied the method, by hand, in a highly schematic but still enormously time-demanding manner. Stan was not fired by any desire that the hydrogen bomb should add a new dimension to the already intolerable capabilities of the atomic bomb—indeed he hoped that it might be possible to show that a thermonuclear weapon was impractical. And actually his and Everett's work strongly indicated impracticality for the particular pattern envisaged at that time (1950). In the meantime, others had prepared a much more elaborate treatment of the

same central problem to be handled on electronic computers. The point had been indicated, and was probably right, and further detailed examination was in proper hands. It was time for him to drop the problem.

Stan subsequently turned his attention to the unique conditions—temperatures, pressures, and energy densities—that are established in the near neighborhood of a fission explosion, and he asked himself about the possible ways one might apply these to realize unprecedented effects. In discussing these speculations with Edward Teller, a completely new approach to obtaining a thermonuclear explosion came in sight. Very quickly the whole program of the Los Alamos Laboratory was redirected to the problems involved in this new approach. From the theoretical point of view, the new effort immediately required intensive and extensive calculations that could be carried out only on the most capable computing machines then available. This was, of course, done, and Stan followed the results with interest—but again, the conduct of this work was not his style. He turned his own personal attention to more long-standing questions having to do, for example, with random processes, nuclear propulsion, mathematical models for biological processes, patterns of growth, and so on.

At the time he retired from the staff of Los Alamos (1967), and to a very large extent since then, the weapons-related activities of the Laboratory were directed mainly to realizing modifications, improvements, or refinements of devices of the sort presaged in the Ulam-Teller proposal of 1951. ■

Carson Mark first came to Los Alamos in May 1945 as a Canadian collaborator on the Manhattan Project. In 1946 he became a member of the permanent staff of the laboratory that arose from the wartime project and was head of its Theoretical Division from 1947 until he retired in 1973.